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Courtney, A. E., Maxwell, A., & Fogarty, D. (2007). Using estimated glomerular filtration rate (eGFR) to help manage patients with chronic kidney disease. *The Ulster Medical Journal*, *76*(3), 154-156.

Published in:
The Ulster Medical Journal

Document Version:
Peer reviewed version

Ulster Med J 2007; **76 (3)** 154-156

Clinical Practice

Using estimated glomerular filtration rate (eGFR) to help manage patients with chronic kidney disease

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Accepted 25 March 2007

INTRODUCTION

Chronic kidney disease (CKD) has been considered an uncommon condition requiring specialist management. The traditional view of CKD has been of patients with end-stage renal disease (ESRD) requiring dialysis or a kidney transplant as forms of renal replacement therapy (RRT). However the prevalence of CKD is much higher than previously appreciated and this has provided a stimulus to the integration of primary and secondary care to optimise the health of persons with CKD. In particular up to 40% of ESRD patients had been referred to specialists shortly before they needed dialysis. Such late referral often results in increased morbidity and mortality for patients and poor acceptance and planning for RRT[1,2].

In 2002, in response to growing evidence confirming the benefit of early versus late renal specialist input, the UK Renal Association proposed that all patients with a serum creatinine level >150 µmol/L should be referred to a nephrologist[3]. However, it soon became apparent that the community prevalence of CKD had been grossly underestimated and strict adherence to this guideline would simply have overwhelmed existing renal services[4]. Although the majority of persons with CKD will never progress to ESRD, they do have an increased rate of cardiovascular events and risk of premature death[5].

Subsequently, in January 2005, the second part of the National Service Framework for Renal Services set standards relating to the prevention, early detection and minimisation of CKD progression[6]. The widespread adoption of a formula based estimation of glomerular filtration rate (eGFR), to be reported by all biochemical laboratories, was recommended to help achieve these goals. The traditional means of assessing renal function using serum creatinine is limited by the variability of this parameter with muscle bulk and age. The degree of renal dysfunction, especially in women and older people, can be underestimated using serum creatinine levels alone and is a major factor in delayed recognition and referral of CKD patients. An eGFR provides a more accurate measurement of kidney impairment. An internationally agreed categorisation of CKD based on a four-variable eGFR equation incorporating age, gender, race and serum creatinine, is now widely utilised (Table I).

UK Guidelines for the management of CKD, developed by the Royal College of Physicians, the Royal College of General Practitioners and the Renal Association were also published in 2005[7]. Recommendations followed suggesting that the markers for quality of care of CKD be incorporated into the Quality and Outcomes Framework (QOF) to enable full implementation of the guidelines across the National Health Service.

Consequently the updated General Practice QOF specified four indicators (accounting for 27 points) in relation to CKD. These depend on the generation of a register of patients with CKD (eGFR <60mls / min / 1.73m^2), measurement of blood pressure, treatment of blood pressure to target, and greater use (if appropriate) of angiotensin converting enzyme inhibitor or angiotensin receptor blocker medication in patients with CKD (Table II)[8].

TABLE I

International classification of chronic kidney disease

Stage	eGFR mls/ min/1.73m^2	Description	
1	90+	Normal kidney function	With urinary or structural abnormalities
2	60-89	Mildly reduced kidney function	With urinary or structural abnormalities
3*	30-59	Moderately reduced kidney function	With or without urinary abnormalities
4*	15-29	Severely reduced kidney function	With or without urinary abnormalities
5*	<15	Established renal failure	Very severe or dialysis-dependent kidney failure

* Stages 3-5 are the stages of CKD currently recognized within the General Practice Quality and Outcomes Framework and thus identified with eGFR reporting.

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TABLE II.

Quality and Outcomes Framework indicators for Chronic Kidney Disease

	Indicator	Points
Records	**CKD 1** The practice can produce a register of patients aged 18 years and over with CKD stages 3-5	**6**
Initial management	**CKD 2** The percentage of patients on the CKD register whose notes have a record of blood pressure in the previous 15 months	**6**
On-going management	**CKD 3** The percentage of patients on the CKD register in whom the last blood pressure reading, measured in the previous 15 months, is 140/85 or less	**11**
	CKD 4 The percentage of patients on the CKD register with hypertension who are treated with an angiotensin converting enzyme inhibitor (ACE-I) or angiotensin receptor blocker (ARB) (unless a contraindication or side effects are recorded)	**4**

STAGE	1	2	3	4	5
eGFR mls/min	≥ 90 + albuminuria or haematuria	60 - 89 + albuminuria or haematuria	30 - 59	15 – 29	<15
Tests	Annual U+E (including eGFR) Annual urine ACR			As before but now 6 monthly.	Check U&E 3 monthly
Treatment	• Treat BP to a target of < 130/80 (threshold to treat is 140/90) • ACEi or ARB if urine ACR ≥ 30 in non-diabetic or ACR >3 in diabetes • Statin if CVD risk ≥20% over 10 years • Aspirin 75mg (if no contraindication) • Advise lifestyle changes as appropriate				
Referral	Fall in eGFR by >15% per year Rise in serum creatinine >20% per year ± Urine ACR ≥ 100 ± Systolic BP ≥ 160 (despite treatment with multiple agents)			Discussion with or referral to renal unit is usual.	Usually automatic (Unless not for active treatment based co-morbidity)

Figure 1. The summary of chronic kidney disease management guidelines recommended by CREST

In Northern Ireland in 2006 the Clinical Resource Efficiency Support Team (CREST) published specific guidelines on CKD management[9], the General Practice QOF targets for CKD were introduced, and all laboratories began to routinely report eGFR with any creatinine measurement. These developments were coupled to local educational initiatives to explain and disseminate best practice for the care of persons with CKD. What conclusions can be drawn from this first year of eGFR reporting in Northern Ireland?

CKD IS COMMON

Patients with an eGFR <60ml/min/1.73m^2 have CKD stage 3, 4 or 5 and are the focus of guidelines and the new QOF indicators. The epidemiological evidence has confirmed that CKD is common in Northern Ireland with approximately 5% of the adult population having CKD stages 3, 4 or 5[4]. The majority of these patients are elderly and although they have minor elevation of serum creatinine they are categorized as having stage 3 CKD based on eGFR. Some clinicians are concerned that use of eGFR generates a 'disease' that may merely be age related kidney function decline. However the data supporting a high risk of cardiovascular events in CKD stage 3 patients is robust and since the growth in ESRD incidence is largely confined to the elderly we consider the benefits of this staging system outweighs this putative drawback.

CKD IS INCREASINGLY RECOGNISED

The identification of patients with CKD has increased following routine eGFR reporting coupled with implementation of CKD QOF criteria. Electronic registers of persons with an eGFR < 60 ml/min/1.73m^2 now exist in general practice and will heighten awareness of opportunities for reduction of cardiovascular risk and reduce the likelihood of prescribing problems in persons with renal impairment.

THE MAJORITY OF CKD IS MANAGED IN PRIMARY CARE

For CKD patients, the guidelines recommend targeting classical cardiovascular risk factors, including meticulous control of blood pressure and lipids, smoking cessation, lifestyle advice and, in diabetic patients, optimisation of blood sugar control. Since many of these patients' main risk is cardiovascular in nature the most relevant and cost-effective place for this to happen is primary care, as suggested by the guidelines for CKD[7]. The local guidelines provide specific advice on those who would benefit from specialist input[9], and a summary version has been distributed to GPs (fig 1).

AN IMPORTANT MINORITY PROGRESS TO END-STAGE RENAL DISEASE

Unfortunately some people with CKD stages 3 and 4 will progress to ESRD (stage 5 CKD) and require dialysis.[10] Diabetes, hypertension and proteinuria are all predictors for progressive renal failure. The number of people with ESRD requiring RRT continues to rise worldwide placing an increasing strain

on limited healthcare resources. In Northern Ireland, at the start of 2007, over 750 patients were receiving regular dialysis therapy with the absolute number of dialysis patients predicted to rise to over 1000 by the end of 2010. While the provision of RRT in Northern Ireland compares very favourably with the rest of the UK, (the dialysis take-on rate here is the higher than all other UK regions)[11], the UK has the lowest dialysis provision per million population in the developed world. It is projected that prevalent dialysis patient numbers will not reach steady state for at least a further 20 to 25 years[11].

RRT is expensive with an estimation that in the near future it will account for 2% of the total NHS budget.[7] Despite the commendable dialysis take-on rate in Northern Ireland there has been evidence of both under- and late-referral[4,12]. CKD must therefore remain a high profile public health issue. The identification and early referral of the subgroup of patients that would benefit from specialist renal input will reduce the costs incurred by late referral[2]. However before realizing this there will need to be an increase in nephrology outpatient services to support primary care colleagues in this endeavour.

There are testing times ahead for primary and secondary care health professionals managing persons with CKD. The introduction of eGFR reporting has provided a useful tool to recognise the burden of CKD in the community and to track the progression of kidney disease in an individual over time.

The authors have no conflict of interest.

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